

## **REMARKS**

### **I. INTRODUCTION**

Upon entry of the present amendment, claims 1-7 will be pending in the present application. By the present amendment, claims 1 and 2 have been amended, and new claims 4-7 have been added. Although Applicant does not agree with the pending rejections, the claims have been amended herein to expedite prosecution of the application. No new matter has been added herein by the present amendment, as support thereof may be found in the current specification at, *inter alia*, page 1, lines 22-26; page 6, line 14 to page 7, line 2; and page 3, lines 4-5.

In view of the foregoing amendments and the following remarks, Applicant respectfully submits that the claims are now in condition for allowance. Applicant points out that the amendments made herein are made without prejudice to the future prosecution of such cancelled, amended or modified subject matter in a related divisional, continuation or continuation-in-part application.

### **II. INTERVIEW SUMMARY**

Applicant thanks Examiner Jessee Roe for the courtesy extended during a telephonic interview with Kevin Godlewski on October 25, 2007. During the interview, the following was discussed:

- (A) No exhibit or demonstration was shown.
- (B) All claims were discussed, particularly independent claims 1 and 2.
- (C) United States Patent Number 4,649,023 ("Sabol et al.") was discussed.

- (D) The possibility of amending independent claims 1 and 2 to further characterize the claimed alloy was discussed.
- (E) Applicant pointed out that as disclosed in Sabol et al., the tin and the third alloying element of the alloys disclosed therein are present in a minimum amount that would be sufficient to give the desired corrosion resistance in the articles produced therefrom.
- (F) It is not believed that other pertinent issues were discussed.
- (G) Applicant indicated that an RCE with a Response to the final Office Action mailed on May 16, 2007 would be subsequently submitted.
- (H) There was no e-mail communication.

**III. REJECTION OF CLAIMS 1 TO 3 UNDER 35 U.S.C. §103(a)**

Claims 1 to 3 stand rejected under 35 U.S.C. §103(a) as being unpatentable over United States Patent Number 5,648,995 ("Mardon et al.") in view of United States Patent Number 4,649,023 ("Sabol et al.") and United States Patent Number 5,832,050 ("Rebeyrolle et al."). It is respectfully submitted that these rejections should be withdrawn for at least the following reasons.

In rejecting a claim under 35 U.S.C. § 103(a), the Examiner bears the initial burden of presenting a *prima facie* case of obviousness. *In re Rijckaert*, 9 F.3d 1531, 1532, 28 U.S.P.Q.2d 1955, 1956 (Fed. Cir. 1993). To establish *prima facie* obviousness, the prior art reference(s) must teach or suggest all of the claim limitations. *In re Royka*, 490 F.2d 981, 180 U.S.P.Q. 580 (C.C.P.A. 1974). However, "a patent composed of several elements is not proved obvious merely by

demonstrating that each element was, independently, known in the prior art.” *KSR*

*Int’l Co. v. Teleflex, Inc.*, 550 U.S. \_\_\_, No. 04-1350, slip op. at 14 (April 30, 2007).

Rather,

[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and to the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.

*Id.* Further, “the claimed combination cannot change the principle of operation of the primary reference or render the reference inoperable for its intended purpose.”

MPEP § 2145. Applicant respectfully submits that a *prima facie* case of obviousness has not been established in regard to the pending claims.

In contrast to the teachings of Mardon et al. in view of Sabol et al. and Rebeyrolle et al., the zirconium based alloy of the present invention, as currently recited in independent claims 1 and 2, includes a “tin content exceeding zero and being 100 ppm or less” in weight. Claims 3-7 depend from claims 1 or 2 and thus include this claim limitation as well. As described in the present specification, the tests set out in Table III (to ascertain the effect of tin) “demonstrate an unexpectedly favorable effect of tin in a lithium-containing medium without any unacceptable degradation as regards corrosion in steam. According to the invention, the maximum tin content must be 100 ppm.” Specification, page 6, lines 27-30.

Mardon et al. is directed to a method of manufacturing a tube for a nuclear fuel assembly, and tubes obtained thereby. Mardon et al. discloses “zirconium-based alloy tubes also containing 50 ppm to 250 ppm iron, 0.8% to 1.3%

by weight niobium, less than 1600 ppm oxygen, less than 200 ppm carbon, and less than 120 ppm silicon.” Mardon et al., col. 1, lines 47-50. However, the only mention of tin in Mardon et al. is that Zircaloy 4 alloys contain 1.20% to 1.70% (by weight) tin. See Mardon et al., col. 1, lines 13-16.

Rebeyrolle et al. is directed to a zirconium-based alloy, manufacturing process, and use in a nuclear reactor. Rebeyrolle et al. discloses that “[t]he alloy has a base composition similar to that of a zirconium alloy of known type used for the manufacture of an element intended for use in the core of a nuclear reactor, such as a cladding tube, a guide tube, or another structural element of a fuel assembly. In addition, the alloy contains sulphur in a proportion by weight of between 8 and 100 ppm and preferably between 8 and 30 ppm.” Rebeyrolle et al., abstract. Although Rebeyrolle et al. does teach that tin may be used in the alloys disclosed therein, Rebeyrolle et al. states that “[i]n particular, the invention applies to a zirconium alloy containing, by weight, from 0.3 to 0.7% of tin, from 0.3 to 0.7% of iron, from 0.1 to 0.4% of chromium, from 0.01 to 0.04% of nickel, from 70 to 120 ppm of silicon and from 500 to 1800 ppm of oxygen.” Rebeyrolle et al., col. 8, lines 46-50.

Sabol et al. is directed to a process for fabricating a zirconium-niobium alloy and articles resulting therefrom. Sabol et al. discloses “zirconium alloys which contain, in percentages by weight, 0.5 to 2.0 percent niobium, up to 1.5 percent tin, and up to about 0.25 percent of a third alloying element such as iron, chromium, molybdenum, vanadium, copper, nickel and tungsten. While tin and the third alloying element are present in an amount up to the percentages by weight listed, *the minimum amount present would be that sufficient to give the desired corrosion resistance in the articles produced therefrom.* Preferably the alloy contains about 1

percent by weight niobium and about 1 percent by weight tin. It is also preferred that the level of the third alloying element be about 0.1 weight percent. A particularly useful alloy has been found to be a zirconium alloy containing 1 percent by weight niobium, 1 percent by weight tin, and 0.1 percent by weight iron.” Sabol et al., col. 2, line 55 to col. 3, line 2 (emphasis added). Thus, Sabol et al. discloses an alloy containing tin in an amount ranging from that which would be “sufficient to give the desired corrosion resistance in the articles produced therefrom” up to 1.5% by weight.

When considering a reference, the reference must be considered as a whole, including those portions that lead away from the presently claimed invention. See *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). A reference that teaches away from the claimed invention may not be relied upon to demonstrate the obviousness of such a claim. See, e.g. *Dow Chem. Co. v. American Cyanamid Co.*, 2 USPQ2d 1350 (Fed. Cir. 1987); *In re Grasselli et al.*, 713 F.2d 731 (Fed. Cir. 1983); *In re Dow Chemical Co.*, 5 USPQ2d 1529 (Fed. Cir. 1988). A reference teaches away from the claimed invention “when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *In re Gurley*, 31 USPQ2d 1130, 1131 (Fed. Cir. 1994). One instance where a reference teaches away from the claimed invention is when the reference leaves the impression that a product embodying the claimed invention would not have the property sought by the patentee. *In re Caldwell*, 138 USPQ 243, 245 (C.C.P.A. 1963). This describes the present situation with respect to Sabol et al. and the presently pending claims

because Sabol et al. leaves the impression that a Zr-Fe-Sn-Nb alloy with a “tin content exceeding zero and being 100 ppm or less” in weight would not achieve a desired corrosion resistance.

As noted above, Sabol et al. discloses an alloy containing tin in an amount ranging from that which would be “sufficient to give the desired corrosion resistance in the articles produced therefrom” up to 1.5% by weight. Sabol et al. also states that “[p]referably the alloy contains about 1 percent by weight niobium and about 1 percent by weight tin.” Sabol et al., col. 2, lines 63-65. Thus, as a whole, Sabol et al. suggests to one of ordinary skill in the art to avoid going below “about 1 percent by weight tin” in order to achieve that which is “sufficient to give the desired corrosion resistance in the articles produced therefrom.” Indeed, throughout the remainder of the specification, Sabol et al. focuses exclusively on zirconium alloys having about 1 percent tin, and testing such alloys for corrosion rates and hydrating resistance in different environments. It is this kind of zirconium alloy that Sabol et al. touts as achieving a central purpose as disclosed therein, namely, the manufacture of a zirconium alloy that exhibits a corrosion resistance that is superior to that of Zircaloy-4. See Sabol et al., col. 4, lines 20-50. By disavowing tin concentrations that are within the range recited in the pending claims as a way of achieving such superior corrosion resistance results, Sabol et al. leaves one of ordinary skill in the art with the impression that a Zr-Nb-Sn-Fe cladding with a “tin content exceeding zero and being 100 ppm or less” (as recited in the pending claims) would not achieve a desirable corrosion resistance. See *Caldwell*, 138 USPQ at 245. Since Sabol et al. suggests that Zr-Nb-Sn-Fe alloys with tin contents within the range recited in the pending claims achieve undesirable corrosion resistance results, and in fact relies on

1 percent tin zirconium alloys to achieve corrosion resistance results superior to those obtainable by Zircaloy-4, Applicant submits that Sabol et al. teaches away from the currently recited range of a "tin content exceeding zero and being 100 ppm or less."

In further contrast to the teachings of Mardon et al. in view of Sabol et al. and Rebeyrolle et al., the zirconium based alloy of the present invention, as currently recited in independent claims 1 and 2, includes "Fe and at least one of the elements selected from the group consisting of Cr and V, *a total of the contents in Fe and Cr + V being 200 to 700 ppm*" (emphasis added). Claims 3-7 depend from claims 1 or 2 and thus include this claim limitation as well.

Therefore, for at least the preceding reasons, Applicant respectfully submits that the pending claims are not rendered obvious by Mardon et al. in view of Sabol et al. and Rebeyrolle et al. Thus, it is respectfully submitted that the rejection of the claims based on these patents should be withdrawn.

**IV. REJECTION OF CLAIMS 1 AND 2 UNDER NONSTATUTORY OBVIOUSNESS-TYPE DOUBLE PATENTING**

Claims 1 and 2 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 9 of United States Patent Number 6,863,745. This obviousness-type double patenting rejection has been noted by the Applicant. If the pending claims are eventually found otherwise allowable, a terminal disclaimer would be timely filed in accordance with 37 C.F.R. § 1.321 in order to obviate this obviousness-type double patenting rejection.

**V. CONCLUSION**

In view of the foregoing, it is respectfully submitted that all pending claims of the present application are now in condition for allowance. Prompt reconsideration and allowance of the present application are therefore earnestly solicited.

Respectfully submitted,  
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